DOCUMENT RESUME

ED 425 171 TM 029 212

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TITLE	GOALS 2000 and Integrated Technology--A National Status Report: Preliminary Results.
PUB DATE	1998-04-16
NOTE	35p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Diego, CA, April 13-17, 1998).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Competence; Educational Objectives; *Educational Technology; Elementary Secondary Education; *Integrated Activities; Mathematics Education; *Principals; Professional Development; Rural Schools; Science Education; Suburban Schools; *Technological Advancement; Urban Schools
IDENTIFIERS	*Goals 2000

ABSTRACT

This study used a cross-sectional survey design to determine the extent to which technology has been integrated in the schools with each of the eight National Education Goals as reported by elementary and secondary school principals from urban, suburban, and rural schools. The eight national goals are defined in the Goals 2000 legislation enacted by Congress in 1994. From a sample of 1,000 elementary school principals and 1,000 secondary school principals, 273 usable responses were returned, a return rate of 14%, from 126 elementary school principals and 147 secondary school principals from 158 rural or small schools, 83 suburban schools, and 32 urban schools. Results suggest a discrepancy between principals' perceived use of technology as it relates to each of the National Education Goals and what would be expected in schools today. Most principals have not defined the importance of technology for each of the goals. Most tended to perceive the inclusion of technology only with regard to Goals 4 and 5, which deal with the continued professional development of teachers and increasing students' competence in mathematics and science. As the year 2000 approaches, schools are not advanced in the use of technology, and have not related technology strongly to the National Education Goals. (Contains 2 tables and 64 references.) (SLD)

Running Head: GOALS 2000

GOALS 2000 and Integrated Technology-

A National Status Report: Preliminary Results

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A paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA, April 16, 1998.

GOALS 2000 and Integrated Technology-

A National Status Report: Preliminary Results

Public dissatisfaction with low student academic performance, increasing global economic competition, and consistently poor results on international assessments led to the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) over a decade ago. Since then, we have witnessed one of the most sustained and consequential periods of school reform in our nation's history. Along with the report of the National Commission came a plethora of others that have questioned the quality of education in America. They have energized a national movement in education on the part of government officials, academic scholars, business leaders, and the education community (Lunenburg & Irby, in press).

In 1989, the nation's Governors and the President reached agreement at an education summit convened in Charlottesville, Virginia, that unless the nation established clear education goals and unless all education stakeholders worked cooperatively to achieve them, the United States would be unprepared to face the technologically, scientific, and economic challenges of the 21st century. Recognizing that the decade of the 90's was about to open with the information superhighway, the 1989 Education Summit led to the adoption of six National Education Goals which set high expectations for education performance at every stage of a learner's life, from preschool years through adulthood (U.S. Department of Education, 1991). These goals established a framework for lifelong learning - a requisite for a world of rapidly changing information.

In March, 1994, Congress adopted the six goals, expanded the number to eight, and put the eight National Education Goals into law by enacting the *Goals 2000: Educate America Act.* The National Goals declare that by the year 2000, all students will arrive at school ready to learn; the high school graduation rate will be at least 90 percent; students will be competent in core academic subjects; teachers will have greater opportunities for

professional development; U.S. students will be first in the world in mathematics and science; all adults will be literate and skilled; every school will be free of drugs and violence; and every school will promote partnerships to increase parental involvement in education.

Efforts to reform education in the past have been more fragmented than coherent; however, the *Goals 2000: Educate America Act* launched a new era in education. First, there had never been any national standards. Second, there had never been any way to measure them. Third, there had never been any national skill standards for our workers. Fourth, we never thought we could do it with grassroots reforms. Additionally, for the first time in history, educators had ready access to information regarding best practices in education and critical asynchronous dialogue regarding school restructuring efforts, mainly due to recent advancements in technology, such as the internet, distance learning, and affordable multimedia computers (Lunenburg & Irby, in press). "...Today we can say, America is serious about education; America cares about the future of every child; America will lead the world in the 21st century..."(Clinton, 1994, p.3).

The purpose of this paper is to report preliminary results of a larger study which focuses on the development of a national status report at the elementary and secondary school levels regarding *Goals 2000* and the extent to which technology has been integrated in the schools with each of the eight National Education Goals.

Methods

This study utilized a cross-sectional survey design to determine the extent to which technology has been integrated in the schools with each of the eight National Education Goals as reported by elementary and secondary school principals from urban, suburban, and rural schools. The eight National Education Goals are defined in the legislation enacted by Congress, entitled *Goals 2000: Educate America Act of 1994* . Technology in this study is defined as the use of technology to promote fundamental school reform as prescribed in *Goals 2000*. The specific technology may include but is not limited to CD-ROMS,

hypertext, the internet, videodisks, microcomputer-based laboratories, virtual reality, local and wide area networks, instructional software, computer stations, laptops, notebooks, educational television, voice mail and e-mail, satellite communications, VCRs, cable TV, and/or interactive video.

Research Questions

Specifically, this study addressed the following research questions: 1) To what extent do principals' responses on each of the 35 items on the instrument, GOALS 2000 and Integrated Technology: A National Survey (Form GT), differ significantly by school level (elementary, secondary) and by school locale (rural, suburban, urban)? and 2) How do all principals perceive the extent of the use of technology in their schools as it relates to the eight National Education Goals?

Subjects

A sample of 1,000 elementary school principals and 1,000 secondary school principals in the United States was randomly selected by Market Data Retrieval (MDR), a Chicago-based firm. MDR's randomization process produced a highly diverse sample of elementary and secondary school principals distributed among urban, suburban, and rural geographic areas spanning the entire range of socioeconomic status found among the 50 states. Oversampling of 2000 principals (1000 elementary, 1000 secondary) in the U.S. was necessary to have a representative return on the cross-sectional survey in the two categories of elementary and secondary principals, as well as in the three categories of geographic locale.

A letter describing the research; a self-addressed, stamped envelope; together with the instrument were mailed to the principals. A total of 273 usable responses were returned -- a 14% return rate.

Instrumentation

To test the two major questions of the study, an operational measure was necessary. Since a validated instrument had not yet been developed, the need arose to

devise an operational measure to examine the use of technology in implementing *Goals 2000*.

One of the early decisions that had to be made in an attempt to measure Goals 2000 and integrated technology centered on the method of measurement to be used. It was decided that a descriptive questionnaire was the most feasible and appropriate for this initial attempt to map the domain of the use of technology and *Goals 2000*. This decision was prompted by the success previous investigators have experienced using the descriptive questionnaire technique (Gross & Herriott, 1965; Halpin, 1956; Halpin & Croft, 1663; Hoy & Clover, 1986; Kottkamp, Mulhern, & Hoy, 1987; Punch, 1967; Stogdill & Coons, 1957). Even though there are criticisms of this technique, especially those that have called into question respondents perceptions as a measure of "true" behavior (Charters, 1964; Erickson, 1965, 1967), it was deemed appropriate for this study.

It was decided to adopt the symbolic interactionist viewpoint taken by a number of previous developers and users of descriptive questionnaires; i.e., that the technique is justified "...more because of than in spite of the susceptibility of these descriptive statements to projective distortion..." (Brown, 1967, pp. 62-73). The metaphysical problem is avoided by assuming that how an individual really behaves is less important than the way he is perceived to behave, since it is perceptions of the integration of technology and *Goals 2000*, that determines the perceivers' own actions. Gay (1996) stated that "descriptive design...describes and interprets what is. It is concerned with conditions or relationships that exist, opinions that are, or trends that are developing" (p.93).

As an operational measure of the integration of technology and Goals 2000, an instrument called GOALS 2000 and Integrated Technology (Form GT) was developed. The final form of the instrument consists of 35 items with five response categories in a five-point Likert scale from "strongly agree" to "strongly disagree," with a neutral point of "undecided". "Undecided" was included because it was believed that principals could respond in this manner if they were still not sure of the degree of integration of technology.

Construction of the instrument was begun by writing sixty-three statements describing the integration of technology and Goals 2000. These statements were based on a review of the literature, the authors' experience in administering public school districts, and items developed by members of an educational leadership preparation program.

The items were then screened for ambiguity, wording, and content overlap. To insure content validity, the resultant pool of items was subjected to the scrutiny and evaluation of three experts: a professor of educational administration, a superintendent of schools, and an independent computer consultant. As a result of this initial work with the instrument, a 35-item form emerged. To examine the internal consistency of the instrument, a Cronbach's coefficient alpha was employed on the instrument administered in a field-test using pre-service administrators. It yielded high reliability (α =0.90), which was consistent with the entire group of returns (α =96).

Data Analysis

To answer Research Question #1, a 2 x 3 factorial ANOVA was conducted using GB-STAT (1995). The independent variables were the two levels of principals and the three levels of geographic locales. The dependent variables were each item on the survey instrument. To answer Research Question #2, the researchers clustered the items by each of the eight national goals, then descriptive statistics of mean and standard deviation for the collective respondents were calculated for the total number of items that represented the respective goal using GB-STAT.

Results and Discussion

There were 273 survey instruments returned during the time sample of one month. No follow-up surveys were sent due to the oversampling for the cross-sectional survey design. Within the 14% return, respondents were 126 elementary principals (46%) and 147 secondary principals (54%) among 158 rural/small school campuses (58%), 83 suburban campuses (30%), and 32 urban campuses (12%). Further results will be reported by research questions.

Research Question #1: To what extent do principals' responses on each of the 35 items on the instrument, GOALS 2000 and Integrated Technology: A National Survey (Form GT), differ significantly by school level (elementary, secondary) and by school locale (rural, suburban, urban)?

A 2 X 3 factorial ANOVA, calculating six cells (rural elementary principal, suburban elementary principal, urban elementary principal, rural secondary principal, suburban secondary principal, urban secondary principal) was employed to respond to this question. Significant differences between cells were calculated using the Tukey/Kramer post-hoc analysis procedure. The level of significance was set at $p \leq .05$. Results for this question are reported by each of the 35 items on the survey instrument and are depicted in Table 1.

Insert Table 1 about here

Item #1: All students in our school/school district have access to high-quality, developmentally appropriate preschool programs that integrate technology to help prepare children for school. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from secondary suburban principals and secondary urban principals, with urban principals having a mean response ($\underline{M}$ = 2.46) and suburban principals having a mean response ($\underline{M}$ = 3.16). All other responses had means ranging from 2.72 to 2.83. Results suggest that all principals either disagree as indicated by the mean response of secondary urban principals or are undecided regarding the integration of technology into preschool experiences. The data do not indicate that elementary principals are any more decisive on this subject than their secondary counterparts. It is possible that the principals were simply unaware of preschool programs that integrate technology.

Item #2: Technology on our campus involves the learner in setting goals, choosing tasks, developing assessments and standards for the tasks; provides the learner with the big picture of learning and the next steps in mind. The two-way ANOVA yielded no significant differences among the groups. All responses ranged from means of 2.90 to 3.33. All principals indicated undecided responses, indicating that technology is not strongly used in choice situations or goal setting for students at elementary or secondary levels.

Item #3: Parents on our campus have access to training in the use of technology to help prepare children for school. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from secondary urban principals and secondary suburban principals, with urban secondary principals having a mean response ($\underline{M}$ = 2.23) indicating disagreement with the item and suburban principals having a mean response ($\underline{M}$ = 2.83) indicating a tendency, using a rounded mean, toward undecided about the item. Another significant difference was observed between urban elementary and urban secondary principals with urban secondary principals indicating disagreement with the item, while the elementary principals indicated a tendency to be undecided about the item with a mean response of 2.77. All other responses ranged from means of 2.47 to 2.62, indicating there was be a tendency to respond to the item "disagree to undecided." The responses do not indicate a strong parental involvement training component in the use of technology.

Item #4: Through the use of technology, all students on our campus are involved in activities that promote and demonstrate good citizenship, good health, community service, and personal responsibility. The two-way ANOVA yielded a significant difference among the groups. Further analysis indicated a significant difference between responses from secondary urban principals and secondary suburban principals, with urban principals having a mean response ($\underline{M}$ = 2.78) and suburban principals having a mean response ($\underline{M}$ = 3.35); yet, both mean responses, if rounded, are "undecided" responses. Another significant difference was observed between urban secondary and urban and suburban

elementary principals with urban elementary principals having a mean score of 3.33 and suburban elementary principals having a mean score of 3.28. Results suggest that principals had a tendency to be "undecided" regarding the use of technology to promote good citizenship, health, community service, and personal responsibility. The data do not indicate that elementary principals are any more decisive on this matter than their secondary school counterparts.

Item #5: All students on our campus have access to rich, challenging learning opportunities and interactive, generative instruction. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from secondary urban principals and all other categories of principals. Mean response scores are: urban secondary principals (M = 3.0), suburban secondary principals (M = 3.82), rural secondary principals (M = 3.44), urban elementary principals (M = 3.77), suburban elementary principals (M = 3.77), rural elementary principals (M = 3.76). Results suggest that all principals, using a rounded mean, agree with this statement, with the exception of urban and rural secondary principals who responded "undecided" regarding the integration of technology to create challenging learning opportunities for students.

Item #6: Our campus uses technology to reduce the school's dropout rate. No significant differences were noted among the campus principals' responses on this item. Mean response scores ranged from 2.99 to 3.22. Results suggest that all principals are "undecided" regarding the use of technology in the reduction of the school's dropout rate.

Item #7: Technology on our campus helps the learner to actively develop a repertoire of thinking/learning strategies. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from elementary suburban principals (M = 4.11) and elementary rural principals (M = 3.59). Other significant difference were observed between urban secondary principals (M = 3.38) and suburban and urban (3.94) elementary

principals, as well as secondary suburban principals (M = 3.74). The results, using a rounded mean, suggest that all principals, except urban secondary principals, agree that the integration of technology in their schools helps students to develop a repertoire of thinking/learning strategies. Urban secondary principals were undecided on this item.

Item # 8: Our campus uses technology to reduce the gap in high school graduation rates between students from minority backgrounds and their non-minority counterparts. The two-way ANOVA yielded a significant difference among the groups. Further analysis indicated a significant difference between responses from urban secondary principals (M = 2.68) and urban elementary principals (M = 3.16). But both means when rounded are at the "undecided" level. The results suggest that all principals are undecided with means ranging from 2.69 to 3.17 regarding the use of technology to reduce the gap in high school graduation rates between minority students and their non-minority counterparts.

Item #9: Technology is used on our campus to increase the percentage of students who are competent in more than one language. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals (M = 2.37) and suburban secondary principals (M = 3.04). Further analysis indicated a significant difference between suburban elementary principals (M = 2.80) urban secondary principals (M = 2.30). Other significant differences were observed between urban secondary principals (M = 2.30) and suburban secondary principals (M = 3.04). Results suggest that all principals either disagree as indicated by the mean responses of rural elementary and urban secondary principals or are undecided regarding the integration of technology to increase the percentage of students who are competent in more than one language. These findings suggest that technology is not being employed to assist in second language acquisition.

Item # 10: Our campus uses technology to increase the academic performance of all students in every quartile. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between

responses from rural elementary principals ($\underline{M}$ = 3.56) and suburban elementary principals ($\underline{M}$ = 4.08); however, with the use of rounded means, both responses indicate agreement. Further analysis indicated a significant difference between suburban elementary principals and urban secondary principals ($\underline{M}$ =3.38) and suburban secondary principals ($\underline{M}$ = 3.58). Other significant differences were observed between urban secondary principals and urban elementary principals ($\underline{M}$ = 3.88). Results suggest that all elementary principals and suburban secondary principals agree that they are using technology to increase the academic performance of all students in every quartile. Urban and rural secondary principals reported undecided to this item.

Item #11: Technology on our campus offers or allows access to tasks, data, and learning opportunities that stimulate thought and inquiry. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals ($\underline{M}$ = 3.38) and four groups of principals: suburban secondary principals ($\underline{M}$ = 4.04), rural secondary principals ($\underline{M}$ = 3.91), urban elementary principals ($\underline{M}$ =3.77), and suburban elementary principals ($\underline{M}$ = 4.05). Further analysis indicated a significant difference between elementary rural principals ($\underline{M}$ = 3.66) and elementary suburban principals. The results suggest that all principals, except urban secondary principals, agree that the integration of technology in their schools offers learning opportunities that stimulate thought and inquiry.

Item #12: Our campus uses technology to help students demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively. The two-way ANOVA yielded a significant difference among the groups. The Tukey post-hoc analysis indicated a significant difference between responses from urban secondary principals ($\underline{M}$ = 3.53) and four groups of principals: suburban secondary principals ($\underline{M}$ = 4.10), rural secondary principals ($\underline{M}$ = 4.01), urban elementary principals ($\underline{M}$ =4.00), and suburban elementary principals ($\underline{M}$ = 4.20). Further analysis indicated a significant difference between elementary rural principals (M = 3.80) and elementary suburban

principals. However, results suggest that all principals agree as indicated by their rounded mean responses that they use technology in their schools to help students to reason and solve problems.

Item #13: Technology on our campus helps students to construct their own meaning by modeling, mediating, explaining when needed, redirecting focus, and providing examples. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals ($M = 2.72$) and four groups of principals: suburban secondary principals ($M = 3.52$), rural secondary principals ($M = 3.44$), urban elementary principals ($M = 3.66$), and suburban elementary principals ($M = 3.58$). Further analysis indicated a significant difference between rural elementary principals ($M = 3.10$) and suburban secondary principals. Also there are significant differences between elementary rural principals ($M = 3.10$) and elementary suburban and urban principals. The results suggest that suburban secondary and urban and suburban elementary principals agree; all others are undecided regarding the integration of technology to help students construct their own meaning from subject matter.

Item #14: Technology on our campus offers access to simulations, goals-based learning, and real-world problems. The two-way ANOVA yielded a significant difference among the groups. Further analysis indicated a significant difference between responses from urban secondary principals ($M = 3.27$) and suburban elementary principals ($M = 3.72$). Additional significant differences were found between suburban secondary principals ($M = 3.84$) and rural elementary principals ($M = 3.40$), as well as between secondary suburban and secondary urban principals. The results suggest that suburban elementary and secondary principals agree, while all others are undecided that the use of technology in their schools offers access to simulations and relevant problems.

Item #15: Our students become knowledgeable about the diverse cultural heritage of this nation and about the world community through the use of technology. The two-way

ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals ($\underline{M} = 3.15$) and rural elementary principals ($\underline{M} = 3.66$). Additional significant differences were found between suburban secondary principals ($\underline{M} = 3.58$) and urban secondary principals. The results suggest that rural elementary and suburban secondary principals agree, and all others are undecided regarding the integration of technology to help students gain knowledge about the Nation's cultural diversity and the global community.

Item #16: Our campus uses technology to implement a firm and fair policy on use, possession, and distribution of drugs and alcohol. No significant differences were found to exist among responses on this item. Mean response scores varied from 2.46 to 2.70. Results suggest that all principals either disagree or are undecided concerning the use of technology in their schools to implement a policy on the use of drugs and alcohol on school grounds.

Item #17: Teachers on our campus have access to continuing professional development activities, that includes technology, to provide them with the knowledge and skills needed to teach to an increasingly diverse student population with a variety of educational, social, and health needs. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals ($\underline{M} = 3.83$) and suburban ($\underline{M} = 4.34$) and urban elementary principals ($\underline{M} = 4.33$). Additional significant differences were found between rural secondary principals ($\underline{M} = 3.84$) and urban elementary principals, as well as between urban secondary ($\underline{M} = 3.69$) and urban elementary principals. Another difference was noted between urban secondary and suburban secondary principals ($\underline{M} = 4.06$). The results suggest that all principals agree that teachers in their schools have access to continuing professional development that includes the use of technology.

Item #18: Our school/school district uses technology to implement a policy to ensure that all schools are free of violence and the unauthorized presence of weapons. No significant differences were found to exist among responses on this item. Mean response scores varied from 2.45 to 2.83. Results suggest that all principals either disagree or are undecided regarding the use of technology in the enforcement of safe schools.

Item #19: Teachers on our campus have continuing opportunities to acquire additional knowledge and skills needed to teach challenging subject matter and to use emerging technologies. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals ($\underline{M}$ = 3.53) and four groups of principals: suburban secondary principals ($\underline{M}$ = 4.12), rural secondary principals ($\underline{M}$ = 3.91), urban elementary principals ($\underline{M}$ =4.50), and suburban elementary principals ($\underline{M}$ = 4.31). Further analysis indicated a significant difference between rural elementary principals ($\underline{M}$ =3.83) and urban elementary ($\underline{M}$ =4.50) and suburban elementary principals ($\underline{M}$ =4.31). The results indicate that all principals agree regarding the integration of technology to stimulate the continuing professional development of teachers in their schools.

Item #20: Technology on our campus helps the learner to develop new ideas and understanding in conversations and work with others. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from secondary urban principals ($\underline{M}$ = 3.53) and four groups of principals: suburban secondary principals ($\underline{M}$ = 4.12), rural secondary principals ($\underline{M}$ = 3.91), urban elementary principals ($\underline{M}$ =4.50), and suburban elementary principals ($\underline{M}$ = 4.31). Further analysis indicated a significant difference between rural elementary principals ($\underline{M}$ =3.83) and urban ($\underline{M}$ =4.50) and suburban ($\underline{M}$ =4.31) elementary principals. The results suggest that all principals agree that the use of technology in their schools helps to stimulate cooperative learning among students.

Item #21: Mathematics and science education, including the use of technology, has been strengthened on our campus. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals (M = 3.72) and three groups of principals: suburban secondary principals (M = 4.08), urban elementary principals (M =4.22), and suburban elementary principals (M = 4.25). Further analysis indicated a significant difference between rural secondary principals (M =3.92) and suburban secondary principals. The results suggest that all principals agree that the use of technology has strengthened mathematics and science education in their schools.

Item #22: Technology on our campus provides students with opportunities to explore new ideas/tools; push the envelope in ideas and research. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals (M = 3.34) and three groups of principals: suburban secondary principals (M = 3.83), urban elementary principals (M =3.94), and suburban elementary principals (M = 4.05). Further analysis indicated a significant difference between urban secondary principals (M =3.38) and three groups of principals: suburban secondary principals (M=3.83), urban elementary principals (M=3.94), and suburban elementary principals (M=4.06). The results suggest that all principals either agree or are undecided that the use of technology in their schools provides students with opportunities to explore new ideas in their class activities.

Item #23: Technology on our campus encourages students to teach others in formal and informal contexts. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals (M = 3.30) and two groups of principals: suburban secondary principals (M = 3.77) and urban elementary principals (M =3.94). Further analysis indicated a significant difference between urban elementary principals (M =3.94) and two groups of principals: rural secondary principals (M=3.52) and urban

secondary principals (M=3.46). The results suggest that all principals either agree or are undecided that the integration of technology stimulates peer tutoring among students.

Item #24: Technology on our campus is instruction oriented to help students construct meaning; providing meaningful activities/experiences. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals (M = 3.31) and four groups of principals: suburban secondary principals (M = 3.73), rural secondary principals (M =3.77), urban elementary principals (M=3.83), suburban elementary principals (M=4.00). Further analysis indicated a significant difference between rural elementary principals (M =3.54) and suburban elementary principals (M=4.00). The results suggest that all principals, except urban secondary principals, agree that the use of technology in their schools helps students to construct their own meaning in learning subject matter.

Item #25: Our campus includes parent involvement programs, including technology, that offers more adult literacy, parent training, and lifelong learning opportunities to the ties between home and school, and enhance parents work and home lives. No significant differences were found to exist among principals' responses on this item. Mean response scores ranged from 2.60 to 3.00. Using rounded means, results suggest that all principals are undecided regarding the use of technology in adult literacy and parent involvement training programs on their campuses.

Item #26: Technology on our campus helps students to develop products of real use to themselves and others. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals (M =2.92) and four groups of principals: suburban secondary principals (M = 3.58), urban elementary principals (M =3.59), urban elementary principals (M = 4.10), and suburban elementary principals (M=3.63). Further analysis indicated a significant difference between urban elementary principals (M =4.10)

and three groups of principals: rural secondary principals (M=3.59), suburban secondary principals (M=3.58), and rural elementary principals (M=3.23). The results suggest that all principals, except rural elementary and urban secondary principals, agree that the integration of technology in their schools helps students develop products associated with their courses.

Item #27: Our school/school district uses technology to eliminate sexual harassment in all schools. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban elementary principals (M =2.72) and two groups of principals: rural elementary principals (M =2.23) and urban secondary principals (M =2.23). The results suggest that all principals either disagree as indicated by the mean responses of rural elementary and urban secondary principals or are undecided regarding the integration of technology to eliminate sexual harassment in their schools.

Item #28: Technology on our campus facilitates integrating discipline to solve problems and address issues. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban elementary principals (M =3.39) and two groups of principals: rural elementary principals (M =2.67), and rural secondary principals (M =2.94). Using rounded means, results suggest that all principals are undecided concerning the use of technology in integrating discipline policies and procedures in their schools

Item #29: Our campus teaches alcohol and drug prevention curriculum that integrates technology as an integral part of sequential and comprehensive education. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer pot-hoc analysis indicated a significant difference between responses from rural elementary principals (M =2.44) and suburban secondary principals (M =2.90).All other responses had means ranging from 2.62 to 2.83. Results suggest that all principals either disagree as

indicated by the mean response of rural elementary principals or are undecided regarding the integration of technology in teaching alcohol and drug prevention in their schools.

Item #30: Technology on our campus provides learning experiences set up to bring multiple perspectives to solve problems such that each perspective contributes to shared understanding for all. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals (M = 2.96) and two groups of principals: urban elementary principals (M = 3.67) and suburban secondary principals (M =3.52). Further analysis indicated a significant difference between urban elementary principals (M =3.67) and rural secondary principals (M=3.13.) and between suburban secondary principals (M=3.52) and rural elementary principals (M=2.96). The results suggest that some groups of principals either agree, as indicated by the mean responses of rural elementary and suburban secondary principals, while others are undecided regarding the integration of technology into problem solving experiences in the classroom.

Item #31: Our campus provides community-based teams, that integrates technology, to provide students and teachers with needed support in alcohol and drug prevention. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from urban secondary principals (M =2.23) and two groups of principals: suburban elementary principals (M =2.69) and urban secondary principals (M =2.84). Further analysis indicated a significant difference between responses from rural elementary principals (M=(2.36) and urban elementary principals (M=2.84). The results suggest some disagreement, as indicated by the mean responses of urban secondary and rural elementary principals, while others are undecided regarding the integration of technology in alcohol and drug prevention school curriculum.

Item #32: Technology on our campus enables access to full diversity of generic and context-specified tools basic to learning and working in the 21st century. . The two-way

ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from suburban secondary principals ($\underline{M}$ =3.49) and two groups of principals: urban secondary principals ($\underline{M}$ =3.00) and rural elementary principals (M=3.02). Using rounded means, results suggest that all principals are undecided concerning the use of technology in enabling student access to cultural diversity.

Item #33: Technology on our campus provides opportunities to use media technologies. No significant differences were found to exist among principals' responses on this item. Mean response scores ranged from 3.57 to 4.10. Using rounded means, results suggest that all principals agree that the use of technology in their schools provides students opportunities to use media technologies.

Item #34: Our campus actively engages parents and families in a partnership that integrates technology to support the academic work of children at home and shared decision making at school. No significant differences were found to exist among principals' responses on this item. Mean response scores ranged from 2.70 to 3.30. Using rounded means, results suggest that all principals are undecided regarding the use of technology to engage parents in a partnership with the school to support the academic work of students.

Item #35: Technology on our campus facilitates the development of skills related to project design and implementation. The two-way ANOVA yielded a significant difference among the groups. The Tukey/Kramer post-hoc analysis indicated a significant difference between responses from rural elementary principals ($\underline{M}$ =2.99) and four groups of principals: suburban elementary principals ($\underline{M}$ = 3.49), urban elementary principals ($\underline{M}$ =3.88), rural secondary principals (M=3.54), and suburban secondary principals (M=3.60). Further analysis indicated a significant difference between urban secondary principals ($\underline{M}$ =3.23) and urban elementary principals (M=3.88). The results suggest that urban elementary and rural secondary principals agree, while all others are undecided

concerning the use of technology to facilitate product design and implementation in students' coursework.

Research Question #2: How do all principals perceive the extent of the use of technology in their school's as it relates to each of the eight National Education Goals?

Means and standard deviations for the principals' responses were calculated for the total number of items that represented each of the respective eight National Education Goals. Results are reported by each of the eight goals and depicted in Table 2.

Insert Table 2 about here

Goal #1: All children in America will start school ready to learn (items 1, 3). The mean for all principals on related clustered items was 2.71 with a standard deviation of 1.05. Using a rounded mean, results suggest that principals are undecided, with little variance, as indicated by the mean and standard deviation of all principals regarding the use of technology in the preparation of students for entry into school. Moreover, further analysis of the mean scores indicated that elementary principals are not any more decisive about this matter than secondary school principals.

Goal One implies universal access to appropriate preschool environments, parental support in the child's preschool education, and attention to health and prenatal care (Lunenburg, 1992). The first National Education Goal and the position statement of the National Association of Education for Young Children (NAEYC) sets the stage for a national commitment to early childhood education. NAEYC underscores developmentally appropriate preschool learning environments, the critical role parents play in the education process, and the importance of health and nutrition in the preparation of children for learning. However, these principals were undecided as to how technology enters into supporting appropriate preschool experiences.

Goal #2: The high school graduation rate will increase to at least 90 percent (items 6, 8). The mean for all principals on related clustered items was 3.04 with a standard deviation of 0.97. The results suggest that principals are undecided, with little variance, as indicated by the mean and standard deviation for all principals about using technology to increase the high school graduation rate. In analyzing the mean scores of elementary and secondary principals on items that represent Goal 2, however, secondary principals were slightly more concerned about increasing the high school graduation rate than elementary principals.

Many studies have been conducted to determine who drops out and why. Although numerous reasons have been given, poor academic performance, absenteeism, discipline problems, and grade retention have been consistently associated with high school attrition (Baldwin, Moffett, & Lane, 1992; Manning & Baruth, 1995; Praport, 1993; Ruff, 1993). For many of these potential dropouts, poor academic performance begins early in their school experiences. Often they come to school lacking basic skills prerequisite to learning. For this reason, elementary school principals need to be as concerned about decreasing the dropout rate as their secondary school counterparts. Furthermore, technology may help to create a more stimulating learning environment for all students.

Goal #3: All students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter including English, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography, and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our Nation's modern economy (items 2, 4, 5, 7, 9, 10, 11,12, 13, 14, 15, 20, 22, 23, 24, 26, 30, 32, 33, 35). The mean score on Goal 3 for principals on related clustered items was 3.49 with a standard deviation of 0.73. Using a rounded mean, the results suggest that all principals are undecided, with little variance, as indicated by the mean and standard

deviations for all principals regarding the use of technology in improving the competency of students in the core subject areas.

Although each of the eight National Education Goals is important, increasing student achievement in the core subjects will be the ultimate test of successful education reform. To achieve major improvements in student achievement will require fundamental changes in the expectations schools set for *all* students, the types of courses schools offer, the way teachers are trained (see Goal 4), and the way subject matter is taught. Principals should consider recent movements such as critical thinking (Foundation for Critical Thinking, 1997) and constructivism (Brooks & Brooks, 1993; Marzano, 1992; McClelland, Marsh, & Podemski, 1994; Resnick & Klopfer, 1989, Strommen & Lincoln, 1992) that offer real promise for improving the achievement of *all* students in the core subject areas. These processes have resulted in substantial advances in student learning (Berlin & Pufall, 1992; Halford, 1993; Presseisen, 1986; Resnick & Klopfer, 1989; Schunk & Zimmerman, 1994; Steffe & Gale, 1995). These instructional designs and processes are well suited to technological intervention within the classroom (Lunenburg & Irby, in press).

<u>*Goal #4*: The Nation's teaching force will have access to programs for the continued improvement of their professional skills and the opportunity to acquire the knowledge and skills needed to instruct and prepare all American students for the next century</u> (items 17, 19). The mean score on Goal 4 for principals on related clustered items was 3.99 with a standard deviation of 0.89. The results suggest that principals agree, with little variance, as indicated by the mean and standard deviation for all principals regarding the importance of continued professional development for teachers.

Professional development, which includes instruction in the use of technology in teaching, is critical for the preparation and continued growth of teachers and principals (Lunenburg, 1995; Lunenburg & Ornstein, 1996; Lunenburg & Irby, in press). Researchers (Cawelti, 1995; Chase, 1998; Darling-Hammond, 1996, 1997; Elmore, 1996;

Feldman, 1998; Fullan & Hargreaves, 1996; Goodlad, 1994; McIntire, 1995; Reynolds, 1996; Rigden, 1996; Seashore-Lewis, 1995; Shanker, 1996; Teitel, 1996) suggest that professional development should provide opportunities for teachers to reflect critically on their practice and to fashion new knowledge and beliefs about content, pedagogy, and learners. Furthermore, they suggested that professional development should prepare teachers to see complex subject matter from the perspective of diverse students. As these authors called for a change in the professional development of teachers, Brown & Irby (1997) followed with a call for a change in the professional growth of principals that would enable them to refine leader practices and to increase school effectiveness. Brown and Irby suggested that principals who engage in self assessment, in problem solving dialogue with colleagues, in reading to gain information, in using technology, and in establishing professional goals, are principals who direct and enhance not only their own professional development, but also the professional development of their faculty.

Goal #5: United States students will be first in the world in mathematics and science achievement (items 21, 12, 30). The mean score on Goal 5 for all principals on related clustered items was 3.72 with a standard deviation of 0.77. The results suggest that principals agree, with little variance, as indicated by the rounded mean and standard deviation for all principals regarding the integration of technology for improving mathematics and science instruction.

With the advancement of technology into both curriculum and instruction in current mathematics and science education reform documents (National Council of Teachers of Mathematics, 1989; National Committee on Science Education Standards and Assessment, 1996), principals will need to consider technology as an integrated part of the curriculum. Furthermore, the role of technology has been specifically addressed in the *Assessment Standards for School Mathematics* (National Council of Teachers of Mathematics, 1995) and the *National Science Education Standards* (National Committee on Science Education Standards and Assessment, 1996).

The Berlin-White Integration of Technology (BWIT) model can serve as a template for integrated school science and mathematics, assessment, and technology (Berlin & White, 1987). The following characteristics can guide in the development of assessment for integrated school science and mathematics that can utilize the potential of technology: (1) engage students in problem solving, (2) engage students in inquiry, (3) invoke real world applications; contextualized problems; (4) use performance-based tasks; (5) use tasks imbedded within instruction; (6) use appropriate technology; (7) provide for multimodal experiences and opportunities for modal translations; (8) provide opportunities for communication, collaboration, and socialization; (9) encourage multiple modes of expression; (10) encourage higher-order thinking skills; (11) reveal conceptual knowledge; (12) reveal procedural knowledge; (13) reveal student processing, reasoning; and (14) recognize student attitudes and perceptions (Berlin & White, 1995, p. 53).

Principals can integrate Goal 5 with Goal 3 and double the impact in mathematics and science reform (Lunenburg & Irby, in press)

Goal #6: Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship (item 25). The mean score on Goal 6 for all principals was 2.75 with a standard deviation of 1.17. The results suggest that principals are undecided, with little variance, as indicated by the rounded mean and standard deviation for all principals regarding the use of technology to increase adult literacy.

School principals concerned about reducing the dropout rate (Goal 2) and increasing school success for *all* students (Goals 3 and 5) need to consider the parents' literacy levels, or they will be ignoring an important aspect of the school success equation. Recognition of the intergenerational role that parents play as family educators places a much higher premium on the importance of adult literacy programs than has been accorded previously (Lunenburg, 1992). For this reason, it is important for principals to implement adult literacy or family literacy programs and training in the use of technology in their

schools to work toward maximizing the goal of "every adult literate" (Lunenburg & Irby, in press).

Goal #7: Every school in the United States will be free of drugs, violence, and the unauthorized presence of firearms and alcohol and will offer a disciplined environment conducive to learning (items 16, 18, 27, 28, 29, 31). The mean score on Goal 7 for all principals was 2.63 with a standard deviation of 0.84. The results suggest that principals are undecided, with little variance, as indicated by the rounded mean and standard deviation of all principals about using technology to provide a drug-free/violence-free school environment.

Growing violence, chaos in classrooms, and access to drugs are a regular part of the school day for an increasing number of students. Frequently the violence in a community spills into the schools. Although the situation in some schools and neighborhoods is more serious than in others, creating a safe, disciplined, drug-free learning environment, which integrates technology, is a challenge for all school principals. Increasing the graduation rate (Goal 2), improving student achievement in challenging subject matter (Goals 3 and 5), and ensuring the ability of our students to compete in a world economy, and carry out their responsibilities of citizenship (Goal 6) will be much more difficult to achieve if our schools and neighborhoods are unsafe for our children and devoid of the latest advances in technology.

Goal #8: Every school will promote partnerships that will increase parental involvement and participation in promoting the social, emotional, and academic growth of children (items 34, 3). The mean score on Goal 8 for all principals on related clustered items was 2.72 with a standard deviation of 0.99. The results suggest that all principals are undecided, with little variance, as indicated by the rounded mean and standard deviation for all principals regarding the use of technology to promote parental involvement in their schools.

The importance of effective home-school partnerships has been identified as a critical factor in the academic success of students. It appears that parents who have high expectations for their children's achievement (Gottfried & Gottfried, 1989; Parsons, Adler, & Kaczala, 1982; Seginer, 1983, 1986; Thompson, Alexander, & Entwisle, 1988), participate in school activities (Epstein, 1985; Linney & Vernberg, 1983; Stevenson & Baker, 1987), offer encouragement (Grolnick & Slowiaczek, 1994; Holloway & Hess, 1982; Sigel, 1982; Stevenson, Lee, Chen, Lummis, Sigler, Fan, & Ge, 1990), and provide positive home learning environments, including support for the use of technology (Epstein, 1987; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Stevenson & Baker, 1987) influence the pupils' academic achievement.

In restructuring schools for the 21st century, plans must be made to include parents and the integration of technology in the school curriculum. As the aforementioned research indicates, all parents must be a part of their children's educational program. If parents are unable to understand and support school activities in the target language, then programs to assist LEP parents in doing so must be established by school principals. Many programs of this nature exist and can be found in evaluations of federally funded programs at the U.S. Department of Education. Other programs of this type may be found on the internet. Information is available to school principals as they facilitate making parents feel a part of the school so that their children's social, emotional, and academic well-being can be enhanced (Lunenburg & Irby, in press).

Summary and Conclusions

Based on the results of this study, there appears to be a discrepancy between principals' perceived use of technology as it relates to each of the eight National Education Goals and what would be expected regarding both in schools today. It would be expected that school leaders would be responding positively to items of inclusion of technology and the National Education Goals as they and their faculties are working toward reform in the information age. It appears that most principals responding in this survey are not clearly

defined as to their schools' uses of technology, particularly in regard to the National Education Goals. Principals tended to perceive the inclusion of technology only with respect to Goals #4 and #5, which deal with the continued professional development of teachers and increasing students' competence in mathematics and science, respectively. It appears that as the year 2000 approaches and as we find ourselves in the middle of the Information Age, schools are not advanced in the expected use of technology nor are they strongly relating technology to the National Education Goals.

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Table 1

Analysis of Variance Data for the Influence of Grade Level and Geographic Locale on Goals 2000 and Integrated Technology

Item	Source	SS	df	MS	F
1	A x B	10.77	2	5.39	5.55**
2	A x B	1.64	2	0.82	1.09
3	A x B	15.7	2	7.85	7.98**
4	A x B	7.9	2	3.95	4.84**
5	A x B	13.63	2	6.82	10.72**
6	A x B	1.34	2	0.67	0.90
7	A x B	8.89	2	4.44	9.76**
8	A x B	9.18	2	4.59	7.29**
9	A x B	13.66	2	6.83	8.37**
10	A x B	10.30	2	5.15	7.75**
11	A x B	8.34	2	4.17	8.30**
12	A x B	8.78	2	4.39	11.26**
13	A x B	34.00	2	17.00	31.13**
14	A x B	5.15	2	2.57	5.54**
15	A x B	10.47	2	5.23	7.91**
16	A x B	1.90	2	0.95	1.46
17	A x B	8.50	2	4.25	8.03**
18	A x B	2.35	2	1.18	1.67
19	A x B	23.09	2	11.55	24.67**
20	A x B	22.01	2	11.00	21.76**
21	A x B	4.70	2	2.35	5.43**
22	A x B	14.79	2	7.40	12.81**
23	A x B	13.69	2	6.84	11.74**
24	A x B	11.57	2	5.79	12.30**
25	A x B	3.45	2	1.73	2.16
26	A x B	46.59	2	23.29	37.39**
27	A x B	9.32	2	4.66	9.02**
28	A x B	9.00	2	4.40	6.44**
29	A x B	5.09	2	2.54	3.76*
30	A x B	14.15	2	7.07	11.14**
31	A x B	13.38	2	6.69	11.08**
32	A x B	11.28	2	5.64	8.33**
33	A x B	1.17	2	0.58	1.29
34	A x B	1.63	2	0.81	1.27
35	A x B	28.84	2	14.41	26.66**

*$p \leq .05$
**$p \leq .01$

Table 2

Means and Standard Deviations for Each of the Eight National Education Goals

Goal	Sample	M	Rounded M	SD
1	273	2.71	3.00	1.05
2	273	3.04	3.00	0.97
3	273	3.49	3.00	0.73
4	273	3.99	4.00	0.89
5	273	3.72	4.00	0.77
6	273	2.75	3.00	1.17
7	273	2.63	3.00	0.84
8	273	2.72	3.00	0.99

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